Are Virtual Patients effective to train diagnostic skills? A study with bulimia nervosa virtual patients

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1. Introduction

Differential diagnosis is carried out early during the diagnostic interview, and this process requires a series of abilities that must be developed through sound training. The use of virtual reality in interactive simulations with Virtual Patients (VPs) enables students to learn by doing, through first-person experience, without interaction with real patients. VPs are interactive computer simulations of patient encounters used in health care education for learning and assessment. They typically include interactive features for illness history taking, explorations, tests, and features for suggesting diagnosis and treatment plans [Fors, Muntean, Botezatu and Zary, 2009]. VPs have been shown to have a great educational value especially for training clinical reasoning [Cook and Triola, 2009] and differential diagnosis [Peñaloza-Salazar et al. 2011]. The present study tested an application for teaching healthcare professionals the skills required to perform the differential diagnosis of bulimia nervosa.

2. Methods

A virtual medical office was developed in which the learner could conduct a clinical interview with different VPs. Each of these VPs had a specific mental disorder: either bulimia nervosa or another disorder that may mimic bulimia. In this simulation, skills of differential diagnosis are taught via a series of diagnostic interviews conducted with these VPs. The objective of the interviews is to obtain enough data to formulate a diagnosis. These simulations are presented with Head Mounted Displays (HMD) plus tracking devices.

Fifty-six undergraduate students in psychology at the University of Barcelona participated in the study. Mean age was 22.12 (SD= 3.26) and the majority were female (87.5%). The ethics committee of the center had previously approved the study and participants signed an informed consent form. Participants were randomly assigned to one of the following conditions: the experimental group (28 students) which received differential diagnosis skills training using the simulated interviews, and the control group (also 28 students) which received training using the traditional method of role playing. Two professors were assigned to each group. Students in the experimental group attended two consecutive 50- minute sessions with a ten-minute pause in the laboratory.

Each student received a basic explanation of the main characteristics of bulimia nervosa. They then interacted with the VPs presenting the disorders. The same procedure was applied to the students in the control group; however, instead of interacting with the VPs, they received traditional training based on role playing in which the professor played the role of the patient and students performed the interviews to identify the correct diagnosis. Finally, the effects of the two different training procedures on the students' learning were compared. Students in both groups completed a diagnostic interview skills test comprising 50 written questions: the final score was calculated taking into account the correct answers converted into a 10-point scale.

3. Results and conclusions

After confirming the homogeneity of the experimental and control groups in terms of age and gender, a t-test for independent samples was conducted to assess the differences between the scores obtained by students in the two groups in the diagnostic interview skills test. Students who were trained with VPs obtained better scores (7.82; SD=1.33) than the students trained with the traditional role-playing method (5.28; SD=1.88) ($t=5.81$; $p<$ 0,001). Given that the experimental and control groups were homogeneous in age and gender, the differences can be attributed to the different training programs applied to the two groups. These results show that VPs are more effective for training differential diagnosis skills than traditional role-playing methods. The higher proportion of women is a limitation in this study. Future studies comparing the effectiveness of VPs in both men and women are necessary.

Acknowledgments

This study was supported by the Spanish Ministry of Science and Innovation (Project PSI2011-28801: "*Virtual Reality Cue Exposure Treatment for Bulimia Nervosa*".

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VRST 2013, October 6 – 9, 2013, Singapore.

ACM 978-1-4503-2379-6/13/10